

Metal Mesh Filters for Terahertz Receivers, Phase I

Completed Technology Project (2005 - 2005)



Project Introduction

The best low-noise receiver solutions for frequencies above about 800 GHz rely on either a low-noise bolometric direct detector or a hot electron bolometric mixer. These receivers yield near quantum limited noise performance and have ultra broad signal bandwidth [, ,]. However, due to their extreme sensitivity and inherently broad bandwidth the receivers are very sensitive to stray radiation. For direct detectors an input filter is required to define the receiver's frequency band and reject out of band energy. In the case of a heterodyne receiver, the signal band is defined by the back-end electronics, however, input filters are required to eliminate stray radiation that can saturate the mixer or create signal artifacts that degrade performance and prevent accurate calibration. Through this SBIR project VDI proposes to create a new generation of high performance and cost effective metal mesh filters for terahertz receivers based on innovative filter designs and fabrication techniques. These new technologies will allow the development of cost-effective and practical filters with the range of characteristics required for NASA's terahertz frequency space science and Earth science remote sensing programs.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★ Jet Propulsion Laboratory (JPL)	Lead Organization	NASA Center	Pasadena, California
Virginia Diodes, Inc.	Supporting Organization	Industry	Charlottesville, Virginia

Primary U.S. Work Locations	
California	Virginia

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Jeffrey Hesler

Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes